Space Weather Forecast

Issued on Thursday 23 January 2025 at 12:16 Local

This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

---

Space Weather Forecast Headline: Chance Moderate geomagnetic storm (G2) in UTC weekend. Minor radio blackouts (R1) likely at times throughout.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Activity was at Low levels, peaking with a high-end common class flare observed at 23/0203UTC from the largest and most complex sunspot region.

There are currently eight sunspot regions on the Earth-facing side of the Sun. The largest region appears to be in a mature phase, with slight reduction in area in its central and trailing portions. By contrast, two regions were seen to grow rapidly in the period: one in the southeast; and one in the northwest. Other regions' changes were generally slower, with a further group in the east seeing some minor intermediate spot development.

No new Earth-directed Coronal Mass Ejections (CMEs) were in evidence - a disappearing 'filament' (arc of plasma) at 23/0500UTC on near infrared imagery from near S25W025 was not obviously apparent on available wider satellite imagery - although a naarrow feature seen heading southwest will be assessed.

Prior to this reporting period, a Moderate-class flare peaking at 22/1108UTC was associated with a 'filament eruption' (arc of plasma) to the east of the largest sunspot region. This CME has been (re-)assessed as bearing a potential Earth-bound component, and may cross the track of Earth's orbit (mainly below it) into the UTC evening of Saturday 25 January. This is expected to follow on the heels (passing within the same UTC day) of a still fainter glance from an earlier CME associated with another Moderate-class flare from 21 January. Satellite imagery in the past 24-hour period was otherwise identified as far-sided, with the arriving eastern solar horizon perhaps harbouring significant regions, judging from recent CME evidence triangulated to 100-110E (the eastern horizon being 90E).

Solar Wind / Geomagnetic Activity: Earth appears to be transiting a sector of space affected by the waning influence from a 'coronal hole'-driven fast wind. The solar wind speed was slightly elevated, but with a slight downward trajectory. The number of particles in the wind was generally within background, while their associated magnetic field was small-scale and erratic in character. The net result of the above solar wind measures was mainly quiet geomagnetic activity.

Energetic Particles / Solar Radiation: Solar radiation showed a slight upward response in the 10MeV channel from 22/1800UTC, albeit peaking below 1pfu (where minor solar radiation storm

© Crown Copyright 2025. All Rights Reserved.

S1 starts at 10pfu). The cause is not clear, but may be related to an indirect particle route from the Moderate-class flare and filament seen 22/1108UTC, or else a far-sided event.

Four-Day Space Weather Forecast Summary

Solar Activity: Moderate activity is forecast, with isolated Moderate-class flares likely and with a slight chance of isolated Strong-class flares.

Solar Wind / Geomagnetic Activity: The only 'coronal hole' fast wind to feature in the period is the current one which is now waning. This should now play no part in forecast geomagnetic activity.

By contrast, up to two CMEs now feature in the forecast - firstly that associated with a Moderate-class flare on 21 January, and secondly a filament- and Moderate-class flare-related event from 22/1108UTC. There is a chance of G2 Moderate geomagnetic storm intervals on Saturday 25 January, with this risk reducing later in the UTC weekend.

Energetic Particles / Solar Radiation: There remains a slight chance of enhancements exceeding the S1 minor radiation storm threshold, should any notable flares occur.

Geomagnetic Storms

Geomagnetic Storm	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Minor or Moderate	G1 to G2	No	1	1	40	30
Strong	G3	No	1	1	15	10
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X-Ray Flares

X-Ray Flares	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability			(%)	(%)	(%)	(%)
Active	R1-R2 (M Class)	No	70	70	70	70
Very Active	R3-R5 (X Class)	No	10	10	10	10

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 370 900 0100 Email: enquiries@metoffice.gov.uk

© Crown Copyright 2025. All Rights Reserved.

Solar Radiation Storms (High Energy Protons)

Radiation Storms Probability (Exceedance)	Level ($cm^{-2}sr^{-1}s^{-1}$)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**≥ S1**	No	15	15	20	20
Very Active	**≥ S3 ***	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and/or 50 MeV ≥ 10pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 370 900 0100 Email: enquiries@metoffice.gov.uk

© Crown Copyright 2025. All Rights Reserved.